Stow Conservation Commission
Minutes
May 10, 2022

A meeting of the Stow Conservation Commission was held on May 10, 2022 at 7:30 in the evening remotely VIA Zoom Videoconferencing in accordance with the Governors' Executive Order on Remote Meeting participation.

There were present:	Serena Furman, Chair
	Liza Mattison
	Jeff Saunders
	Ingeborg Hegemann Clark
Absent:	Matt Styckiewicz, Vice Chair
	Holly Clack
	Doug Morse
Also Present:	Kathy Sferra, Conservation Director
	Jacquie Goring, Conservation Assistant

Serena Furman called the meeting to order at 7:30 pm. Present from the Hudson Conservation Commission were Hudson Conservation Commission Agent Pam Helinek, Hudson Conservation Commission Chair James Martin, and Hudson Conservation Commission members Paul Osborne, Brandon Parker, and Debbie Edelstein.

Citizen Science Coordinator Rebecca Longvall, Lake Boon Commission member Dan Barstow, Lake Boon Association member Dave Gray, and Kirk Westphal and Andrew Goldberg of Brown & Caldwell also were present. Dan Barstow introduced the presentation by reviewing the changes at Lake Boon, transitioning from a summer retreat with cottages to many residents living year-round. Barstow also noted the climate changes including more intense storms and shorter freeze cycles.

Westphal reviewed the findings from the Municipal Vulnerability Preparedness (MVP) Healthy Lake Boon project. The goal of the project was to determine the sources of phosphorus in Lake Boon, which cause harmful algal blooms, and determine actions that can be taken to reduce phosphorus that will endure with climate change. Westphal reviewed previous studies done on Lake Boon to determine the source of phosphorus. There has been a lot of uncertainty about phosphorus in Lake Boon and if the source is from septic, groundwater, lawns, leaves, or sediment. A 1984 study concluded that 0 to 80% of phosphorus could be attributed to septic systems. A 1998 study concluded that 10% of the phosphorus load in Lake Boon was from septic systems.

In 2020, Stow and Hudson were awarded an MVP Action Grant to collect data on Lake Boon using volunteers and a consulting firm to analyze the data and develop models to determine the source of

phosphorus and if the lake is at risk of algal blooms. Monthly sampling was done by citizen scientists. Data analysis and modeling was used by Brown and Caldwell to extrapolate the climate change impacts. The goals of the modeling are to understand the basic dynamics of how much surface water, groundwater, and sediment contribute to phosphorus and possible management strategies.

Monthly data was collected from the two tributaries contributing surface water run off to Lake Boon including Monahan's Cove and a tributary from the Assabet River National Wildlife Refuge. Westphal noted that 20 micrograms per liter of phosphorus was set as a target by a previous Lake Boon Study and 25 micrograms per liter is the threshold set by EPA for an impounded lake. The data collected found that most of the data points across the lake were below the 20 micrograms per liter threshold except for water samples from both tributaries. Westphal noted that the Monahan's Cove watershed is a major source of phosphorus to the Lake. Westphal noted that the data indicated that the prevailing load during the sampling period was surface water, but it was a very wet year so they are hoping for a dryer year this year for comparison. Westphal confirmed phosphorus concentrations in groundwater were low.

Westphal described the process of phosphorus in sediment when anoxic conditions occur in deep water at the bottom of the lake during the summer causing phosphorous to unbind from iron in the sediment and enter the water column. Westphal stated that the data has shown that the first basin is the deepest area of the lake and goes through periods of very low oxygen. Members of the UMASS dive team collected sediment cores of the lake bottom and tested them in a lab through controlled conditions. That data confirmed that the rate phosphorus comes out of the sediment in the first basin is very high during anoxic conditions.

Westphal reviewed the process of fall turnover in the lake when the water at the bottom of the lake is circulated to the top because of temperature changes. Westphal noted that when the lake turns over in the fall the phosphorus that entered the water column in the summer during the anoxic period then comes to the surface, causing harmful algae blooms. Algae blooms did not occur during the summer wet or dry periods and only during the fall turnover. During late October 2021, the amount of phosphorus was over 100 micrograms per liter, five times time higher than target 20 micrograms per liter.

Westphal reviewed the analysis done to simulate the amount of water leaving the lake over the dam and the amount of surface water tributaries and groundwater that enter the lake. Westphal added that the surface water has significantly higher levels of phosphorus than groundwater. Westphal shared a graphic showing the predominate sources of phosphorus into the lake last year were from surface water and sediment, which informed possible mitigation measures.

Goldberg reviewed the preliminary recommendations based on the data and modeling presented by Westphal. A steering committee then narrowed down the list and ranked them. Some of the top tier recommendations include continued monitoring, algal bloom treatment, incentives for septic upgrades, stormwater management, invasive species management, floating wetlands, zoning updates,

and tree planting. Goldberg reviewed outreach opportunities including a presentation at the Lake Boon annual meeting and a formal action plan.

Edelstein asked how long it would take for the sediment to stop excess phosphorus loading in the lake. A study on the Assabet River done 10 years ago estimated that if the river was dredged to remove phosphorus the effectiveness would be lost within two years based on the amount of phosphorus that is entering the river. Westphal stated that because Lake Boon is impounded, it could take five to ten years to reduce phosphorus in the sediment. Westphal added that chemical treatments to suppress phosphorus in sediment are available and could be considered.

Osborne noted the potential implications of the study on the MS4 permitting and Illicit Discharge Detection and Elimination (IDDE) Plans. Goldberg confirmed that both private property and Town owned land could be incentivized including retrofitting municipal owned land by removing pavement and capturing runoff. Westphal noted there may be opportunities around Monahan's Cove where there is significant run off to evaluate storm drains and install swales.

Hegemann Clark asked how many floating wetlands would be needed to be effective on a lake the size of Lake Boon. Hegemann Clark also noted the significant amount of boat traffic and that floating wetlands could be most effective in the shallower areas of the lake. Goldberg agreed and stated that there is research going on now on the effectiveness of floating wetlands.

Barstow noted that the two-year grant will end at the end of the fiscal year and now they must determine how to continue monitoring and implement solutions. The Lake Boon Association will be the lead going forward and some donated funds will be used to continue the citizen scientist data collection and sampling.

Westphal reviewed the information presented about Monahan's Cove watershed including the surrounding neighborhood and golf course. Parker asked if half of the phosphorus in Lake Boon comes from the sediment in the first basin and the other half from Monahan's Cove. Westphal confirmed that was accurate with a small percentage also coming from groundwater. Parker asked if the golf course is a point source for phosphorus and Westphal stated they are trying to get information on the fertilizer used at the golf course. Westphal also confirmed that aeration would not be an effective management strategy to remove phosphorus because of the cost associated with the amount of aeration needed in the first basin. Westphal also clarified that it is unlikely that boating activity and wave action is impacting phosphorous in the lake.

Osborne asked if the amount phosphorus flowing into the lake is larger than what is leaving or is it being stored. Westphal stated that it changes from year to year and the data they collected represents a very wet year. Osborne confirmed with Goldberg that other potential industrial or agricultural land uses are being evaluated as sources for phosphorus in the lake from Monahan's Cove. Barstow noted the development of the Kattelle property in Hudson and the need for a no disturb buffer around the lake.

Sferra noted the draw down is done in October during fall turn over and the period of high levels of phosphorus and the weed treatment could be contributing biomass to the sediment. Westphal stated that phosphorous impacts to the downstream watershed could be coordinated with DEP if both Towns want to change the drawdown schedule to encourage the flow through of phosphorus. However consideration needs to be given to the fact that the Assabet River is also impacted by phosphorus. Westphal added that the settling of biomass from weed treatments is mostly happening in shallower areas of the lake which do not go anoxic in the summer. Westphal added that the weed control is useful to reduce the productivity of the weeds during growing season. Gray added that the treatment was done earlier this year when the plants were smaller with shallower roots.

Barstow reviewed the current cyanobacteria sampling done at the Town beach in Stow by Nashoba Boards of Health. Test kits for cyanobacteria were used during the sampling and the results correlated with lab samples. Barstow added that they will be meeting with the Stow Board of Health to discuss cyanobacteria sampling going forward.

Helinek confirmed the tape will be posted online and Longvall will update the healthylakeboon.org website. Barstow noted that education of residents is crucial and a two-page flyer for lake residents and an annual report will be completed. The benefits of tree planting was discussed and Sferra and Helinek reviewed the resources made available to applicants for native planting.

At 9:10 PM, the Stow Conservation Commission left the Hudson Conservation Commission meeting.

Respectfully submitted,

Jacquelyn Goring, Conservation Assistant

<u>Materials Used at Meeting</u>
Overview of the Lake Boon Evaluation presentation by Brown and Caldwell